

WHAT IS CLAIMED IS:

1. An apparatus for locking and unlocking the brake actuator of a dual chamber brake system that operates with compressed air, wherein the dual chamber includes a brake actuator in a first chamber and a high spring-rate spring in a second chamber, the brake actuator being movable in the axial direction to apply and release the brakes of the brake system; in the absence of compressed air the high spring-rate spring expanding to bias and keep the brake actuator in an axially forward position locking the brakes of the brake system, and wherein when there is compressed air in the second chamber the high spring-rate spring is compressed and allows retraction of the brake actuator from its forward position to unlock the brakes, the apparatus comprising:

electro mechanical means responsive to a first anti-terrorist coded signal for venting pressurized air from the second chamber and for preventing entry of pressurized air into the second chamber whereby expansion of the high spring-rate spring causes the brake actuator to move into the axially forward position locking the brakes of the brake system, the electro mechanical means also being responsive to a second coded signal for allowing pressurized air to enter into the second chamber and for disallowing the venting of pressurized air from the second chamber thereby unlocking the brake actuator and unlocking the brakes.

2. An apparatus in accordance with Claim 1 wherein an inlet port is included in the second chamber, said inlet port allowing attachment of a hose through which pressurized air is normally supplied to the second chamber, and

1 wherein the electro mechanical means include a solenoid valve mounted in the
2 second chamber to shut-off the supply of pressurized air through the inlet port
3 in response to the first coded signal, and allow the supply of pressurized air
4 through the inlet port in response to the second coded signal.

5 3. An apparatus in accordance with Claim 2 wherein a conduit is
6 included in the second chamber for venting pressurized air, said conduit being
7 controlled by the solenoid valve, and wherein the solenoid valve allows the
8 venting of pressurized air through the conduit in response to the first coded
9 signal, and disallows the venting in response to the second coded signal.

10 4. An apparatus in accordance with Claim 1 wherein the electro
11 mechanical means include a solenoid valve and a receiver decoder, said
12 receiver decoder being adapted for receiving the first and second coded signals
13 and for controlling the solenoid valve in response to said signals.

14 5. An apparatus in accordance with Claim 4 wherein the solenoid valve
15 is controlled by the flow of electric current and wherein pressurized air is
16 vented from the second chamber and entry of pressurized air into the second
17 chamber is prevented in the absence of flow of current through the solenoid
18 valve.

19 6. An apparatus in accordance with Claim 5 wherein the current is
20 supplied from a power source, a switch is interposed between the power
21 Source and the solenoid valve, and wherein the receiver decoder controls the
22 switch in response to the first and second signals, respectively.

23 7. A dual chamber brake system that operates with compressed air to be
24 used in trailers and vehicles, the brake system including a brake actuator in a

1 first chamber and a high spring-rate spring in a second chamber, the brake
2 actuator being movable in the axial direction to apply and release the brakes of
3 the brake system; in the absence of compressed air the high spring-rate spring
4 expanding to bias and keep the brake actuator in an axially forward position
5 locking the brakes of the brake system, the high spring-rate spring being
6 compressed and allowing retraction of the brake actuator from its forward
7 position so as to unlock the brakes when there is compressed air in the second
8 chamber, the brake system further comprising:

9 electro mechanical means responsive to a first anti-terrorist coded
10 signal for venting pressurized air from the second chamber and for preventing
11 entry of pressurized air, into the second chamber whereby expansion of the
12 high spring-rate spring causes the brake actuator to move into the axially
13 forward position locking the brakes of the brake system, the electro
14 mechanical means also being responsive to a second coded signal for allowing
15 pressurized air to enter into the second chamber and for disallowing the
16 venting of pressurized air from the second chamber thereby unlocking the
17 brake actuator and unlocking the brakes.

18 **8.** A dual chamber brake system in accordance with Claim 7 wherein an
19 inlet port is included in the second chamber, said inlet port allowing
20 attachment of a hose through which pressurized air is normally supplied to the
21 second chamber, and wherein the electro mechanical means include a solenoid
22 valve mounted in the second chamber to shut-off the supply of pressurized air
23 through the inlet port in response to the first coded signal, and allow the
24 supply of pressurized air through the inlet port in response to the second coded

1 signal.

2 9. A dual chamber brake system in accordance with Claim 8 wherein a
3 conduit is included in the second chamber for venting pressurized air, said
4 conduit being controlled by the solenoid valve, and wherein the solenoid valve
5 allows the venting of pressurized air through the conduit in response to the
6 first coded signal, and disallows the venting in response to the second coded
7 signal.

8 10. A dual chamber brake system in accordance with Claim 7 wherein
9 the electro mechanical means include a solenoid valve and a receiver decoder,
10 said receiver decoder being adapted for receiving the first and second coded
11 signals and for controlling the solenoid valve in response to said signals.

12 11. A dual chamber brake system in accordance with Claim 10 wherein
13 the solenoid valve is controlled by the flow of electric current and wherein
14 pressurized air is vented from the second chamber and entry of pressurized air
15 into the second chamber is prevented in the absence of flow of current through
16 the solenoid valve.

17 12. A dual chamber brake system in accordance with Claim 11 wherein
18 the current is supplied from a power source, a switch is interposed between the
19 power source and the solenoid valve, and wherein the receiver decoder
20 controls the switch in response to the first and second signals, respectively.

21 13. An apparatus for locking and unlocking the brake actuator of a dual
22 chamber brake system that operates with compressed air, wherein the dual
23 chamber includes a brake actuator in a first chamber and a high spring-rate
24 spring in a second chamber, the brake actuator being movable in the axial

1 direction to apply and release the brakes of the brake system; in the absence of
2 compressed air the high spring-rate spring expanding to bias and keep the
3 brake actuator in an axially forward position locking the brakes of the brake
4 system, and wherein when there is compressed air in the second chamber the
5 high spring-rate spring is compressed and allows retraction of the brake
6 actuator from its forward position to unlock the brakes, the apparatus
7 comprising:

8 electro mechanical means responsive to a first anti-terrorist coded
9 signal or to a third anti-theft coded signal different from the first signal, for
10 venting pressurized air from the second chamber and for preventing entry of
11 pressurized air into the second chamber whereby expansion of the high spring
12 rate spring causes the brake actuator to move into the axially forward position
13 locking the brakes of the brake system, the electro mechanical means also
14 being responsive to a second coded signal or to a fourth coded signal for
15 allowing pressurized air, to enter into the second chamber and for disallowing
16 the venting of pressurized air from the second chamber thereby unlocking the
17 brake actuator and unlocking the brakes.

18 **14.** An apparatus in accordance with Claim 13 wherein an inlet port is
19 included in the second chamber, said inlet port allowing attachment of a hose
20 through which pressurized air is normally supplied to the second chamber, and
21 wherein the electro mechanical means include a solenoid valve mounted in the
22 second chamber to shut-off the supply of pressurized air through the inlet port
23 in response to the first or to the third coded signal, and allow the supply of
24 pressurized air through the inlet port in response to the second coded or to the

1 fourth coded signal.

2 15. An apparatus in accordance with Claim 14 wherein a conduit is
3 included in the second chamber for venting pressurized air, said conduit being
4 controlled by the solenoid valve, and wherein the solenoid valve allows the
5 venting of pressurized air through the conduit in response to the first coded
6 signal or in response to the third coded signal, and disallows the venting in
7 response to the second coded signal or in response to the fourth coded signal.

8 16. An apparatus in accordance with Claim 13 wherein the electro
9 mechanical means include a solenoid valve and a receiver decoder, said
10 receiver decoder being adapted for receiving the first, second, third and fourth
11 coded signals and for controlling the solenoid valve in response to said
12 signals.

13 17. An apparatus in accordance with Claim 16 wherein the solenoid
14 valve is controlled by the flow of electric current and wherein pressurized air
15 is vented from the second chamber and entry of pressurized air into the second
16 chamber is prevented in the absence of flow of current through the solenoid
17 valve.

18 18. An apparatus in accordance with Claim 17 wherein the current is
19 supplied from a power source, and wherein the apparatus further comprises
20 switch and circuit means interposed between the power source and the
21 solenoid valve and wherein the receiver decoder controls the switch and
22 circuit means in response to the first, second, third and fourth signals,
23 respectively, the switch and circuit means being adapted for

1 (1) interrupting the flow of current in response to the first signal
2 received by the receiver decoder;
3 (2) interrupting the flow of current in response to the third signal
4 received by the receiver decoder;
5 (3) allowing the flow of current in response to the second signal,
6 received by the receiver decoder, and
7 (4) allowing the flow of current in response to the fourth signal
8 received by the receiver decoder.

9 **19.** An apparatus in accordance with Claim 18 wherein the switch and
10 circuit means include three separate switches, one of said switches being a
11 proximity switch controlled by the position of the brake actuator and staying
12 in a closed position when pressurized air is present in the second chamber, the
13 other two switches being controlled by the receiver decoder.

14 **20.** An apparatus in accordance with Claim 19 wherein the switch and
15 circuit means include

16 (1) a conducting line between the solenoid valve and the power source,
17 said conducting line including one of said switches controlled by the receiver
18 decoder in response to the first and second coded signals, the proximity switch
19 being in line with said switch controlled by the receiver decoder in response to
20 the first and second coded signals,

21 (2) the switch and circuit means further including a second conducting
22 line in parallel with the proximity switch and in line with the switch controlled
23 by the receiver decoder in response to the first and second coded signals, said
24 second conducting line including the second of the three switches, said second

1 switch being controlled by the receiver decoder in response to the third and
2 fourth coded signals.

3 **21.** A dual chamber brake system for locking and unlocking the brake
4 actuator of a dual chamber brake system that operates with compressed air to
5 be used in trailers and vehicles, the brake system including a brake actuator in
6 a first chamber and a high spring-rate spring in a second chamber, the brake
7 actuator being movable in the axial direction to apply and release the brakes of
8 the brake system; in the absence of compressed air the high spring-rate spring
9 expanding to bias and keep the brake actuator in an axially forward position
10 locking the brakes of the brake system, and wherein when there is compressed
11 air in the second chamber the high spring-rate spring is compressed and allows
12 retraction of the brake actuator from its forward position to unlock the brakes,
13 the dual chamber brake system further comprising:

14 electro mechanical means responsive to a first anti-terrorist coded
15 signal or to a third anti-theft coded signal different from the first signal, for
16 venting pressurized air from the second chamber and for preventing entry of
17 pressurized air into the second chamber whereby expansion of the high
18 spring-rate spring causes the brake actuator to move into the axially forward
19 position locking the brakes of the brake system, the electro mechanical means
20 also being responsive to a second coded signal or to a fourth coded signal for
21 allowing pressurized air to enter into the second chamber and for disallowing
22 the venting of pressurized air from the second chamber thereby unlocking the
23 brake actuator and unlocking the brakes.

24 **22.** A dual chamber brake system in accordance with Claim 21 wherein

1 an inlet port is included in the second chamber, said inlet port allowing
2 attachment of a hose through which pressurized air is normally supplied to the
3 second chamber, and wherein the electro mechanical means include a solenoid
4 valve mounted in the second chamber to shut-off the supply of pressurized air
5 through the inlet port in response to the first or to the third coded signal, and
6 allow the supply of pressurized air through the inlet port in response to the
7 second coded or to the fourth coded signal.

8 **23.** A dual chamber brake system in accordance with Claim 22 wherein
9 a conduit is included in the second chamber for venting pressurized air, said
10 conduit being controlled by the solenoid valve, and wherein the solenoid valve
11 allows the venting of pressurized air through the conduit in response to the
12 first coded signal or in response to the third coded signal, and disallows the
13 venting in response to the second coded signal or in response to the fourth
14 coded signal.

15 **24.** A dual chamber brake system in accordance with Claim 21 wherein
16 the electro mechanical means include a solenoid valve and a receiver decoder,
17 said receiver decoder being adapted for receiving the first, second, third and
18 fourth coded signals and for controlling the solenoid valve in response to said
19 signals.

20 **25.** A dual chamber brake system in accordance with Claim 24 wherein
21 the solenoid valve is controlled by the flow of electric current and wherein
22 pressurized air is vented from the second chamber and entry of pressurized air
23 into the second chamber is prevented in the absence of flow of current through
24 the solenoid valve.

1 **26.** A dual chamber brake system in accordance with Claim 25 wherein
2 the Current is supplied from a power source, and wherein the apparatus further
3 comprises switch and circuit means interposed between the power source and
4 the solenoid valve and wherein the receiver decoder controls the switch and
5 circuit means in response to the first, second, third and fourth signals,
6 respectively, the switch and circuit means being adapted for:

7 (1) interrupting the flow of current in response to the first signal
8 received by the receiver decoder;

9 (2) interrupting the flow of current in response to the third signal
10 received by the receiver decoder;

11 (3) allowing the flow of current in response to the second signal
12 received by the receiver decoder, and

13 (4) allowing the flow of current in response to the fourth signal
14 received by the receiver decoder.

15 **27.** A dual chamber brake system in accordance with Claim 26 wherein
16 the switch and circuit means include three separate switches, one of said
17 switches being a proximity switch controlled by the position of the brake
18 actuator and staying in a closed position when pressurized air is present in the
19 second chamber, the other two switches being controlled by the receiver
20 decoder.

21 **28.** A dual chamber brake system in accordance with Claim 27 wherein
22 the switch and circuit means include

23 (1) a conducting line between the solenoid valve and the power source,
24 said conducting line including one of said switches controlled by the receiver

1 decoder in response to the first and second coded signals, the proximity switch
2 being in line with said switch controlled by the receiver decoder in response to
3 the first and second coded signals,

4 (2) the switch and circuit means further including a second conducting
5 line in parallel with the proximity switch and in line with the switch controlled
6 by the receiver decoder in response to the first and second coded signals, said
7 second conducting line including the second of the three switches, said second
8 switch being controlled by the receiver decoder in response to the third and
9 fourth coded signals.

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